

## Two Peculiar Species of Corophiid Amphipods (Crustacea) from the Seto Inland Sea, Japan

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**ABSTRACT**—Two species of the genus *Corophium* (*Corophium lobatum* n. sp. and *C. sinense* Zhang, 1974) taken from the shallow water of the Seto Inland Sea are described and figured. *C. lobatum* n. sp. has the peculiar, fused urosome, and its uropod 2 arise from the base of the urosome instead of the distal part. This new species is clearly distinguished from the known corophiid amphipods by these characteristics. *C. sinense* Zhang, 1974, originally described from the Shantung Peninsula, North China, is new to Japan. The specific characteristics of this species are observed in the mandibular palp that the terminal segment is reduced and directly attaches to the apex of the proximal one.

### INTRODUCTION

During an assesment survey of the marine environment in the Seto Inland Sea, Japan, Mr. N. Sawada collected some specimens of peculiar amphipods from a sandy-mud bed of In-no-shima Island, Hiroshima Prefecture, and sent me for identification. Through a close exmination it became apparent that they were composed of two species of the genus *Corophium*. One species possesses a fused, laterally rounded urosome. This characteristic suggests that the species belongs to Section C of Crawford's system [2, 5, 6], but the uropod 2 of this species attaches to the laterobasal part of its urosome and is well developed. Such an uropod is not found among the corophiid amphipods previously known. On the basis of these characteristics, I will describe it in this paper as a new species of *Corophium*. The other species collected in the present survey is *Corophium*

*sinense* Zhang, 1974 [8], originally described from the Shantung Peninsula, North China. This species, that is new to Japan, is redescribed also in this paper.

All the specimens here described are deposited in the collection of the Biological Laboratory, Department of the Liberal Arts, Asia University, Tokyo.

### *Corophium lobatum* n. sp. (Figs. 1-2)

#### *Description of the holotype (female)*

*Body*: Semicylindrical. Rostrum and eyes small. Pereonites subequal in size; coxae discontinuous in series. Pleonal epimeron 1 rounded, ventrally armed with 3 plumose long and short setae; pleonal epimeron 2 similar to epimeron 1 in form, twice in largeness, ventrally with 3 plumose setae; pleonal epimeron 3 1.5 times as broad as

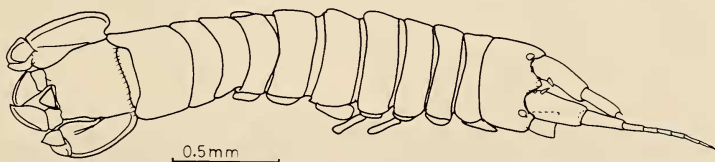


FIG. 1. *Corophium lobatum* n. sp. Holotype: female, 2.16 mm.

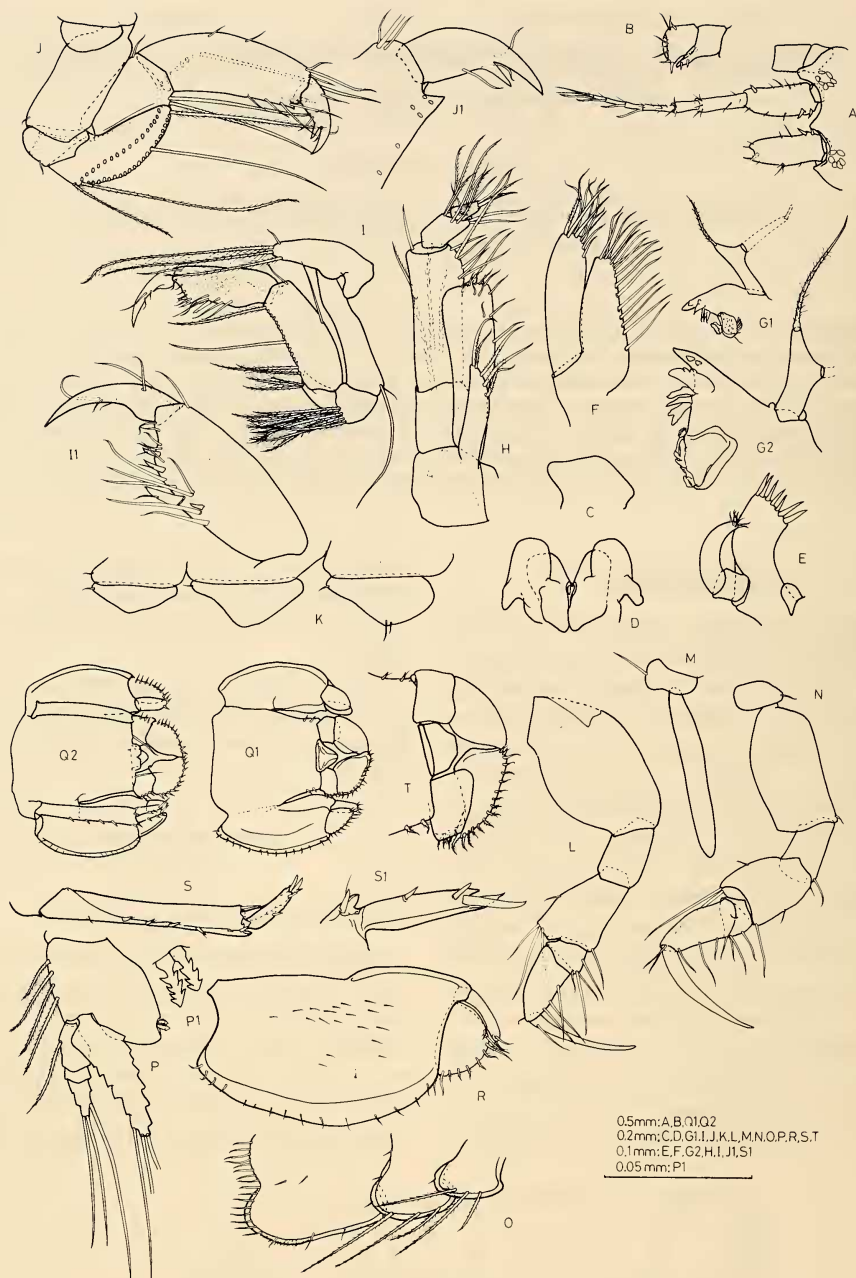


FIG. 2. *Corophium lobatum* n. sp. Holotype: female, 2.16 mm. A: Head and antenna 1. B: Antenna 2. C: Upper lip. D: Lower lip. E: Maxilla 1. F: Maxilla 2. G1: Right mandible. G2: Left mandible. H: Maxilliped. I and I1: Gnathopod 1. J and J1: Gnathopod 2. K: Coxae 5-7. L: Pereopod 1. M: Coxa 3 and gill. N: Pereopod 2. O: Pleonal epimera 1-3. P and P1: Pleopod 1. Q: Urosome in dorsal view. Q2: Urosome in ventral view. R: Uropod 1. S and S1: Uropod 2 and outer ramus (S1). T: Uropod 3 and telson.

epimeron 2, rounded and setaceous posteriorly, without plumose setae. Fused urosome even or slightly concave dorsally, provided with 2 spines on both laterodistal ends, anteroventrally with uropod 1 and anterolaterally with uropod 2.

*Antennae:* Antenna 1 about 1/3 as long as body length; segment 1 of peduncle armed with 2 inner-proximal and 1 outer-distal spines; flagellum 6-articulate, each segment excluding proximal and terminal ones provided with 1 aesthetasc. Both antennae 2 broken and only first two segments remained for each; segments 1–2 of peduncle equal in size, inner-distal process of segment 1 almost reaching apex of segment 2, armed with 2 spines, segment 2 inner-distally armed with 2 opposite spines.

*Mouthparts:* Mandibular process of lower lip medium. Inner plate of maxilla 1 rudimentary, lacking setae; outer plate provided with 7 tooth-like, simple spines; proximal segment of palp developed as corophiids, terminal segment provided with 8 apical small setae. Both plates of maxilla 2 equal in size, outer plate provided with 1 plumose seta on outer side of apex. Both mandibles similar to each other, provided with 3 accessory blades of which the proximal one is bifid; palp biarticulate, terminal segment attached to a slightly upper level against middle of the proximal one. Inner plate of maxilliped slender, provided with 4 pinnate setae on inner 1/3 part from apex; outer plate rectangular, reaching 1/3 point from palpal article 2, dispersively setaceous; palp 4-articulate, terminal segment half the length of segment 3, provided with 1 apical slender spine.

*Gnathopod 1:* Coxa 1 extending forward, slender, ventrally armed with 1 long pinnate seta. Propod shorter than carpus, palm oblique, armed with 2 spines, posterior margin medially armed with 1 pronounced and 1 smaller spines. Dactyl falcate, extending far beyond palm when closed; grasping margin smooth. *Gnathopod 2:* Corophiid-fashion. Carpus about 2/3 as long as merus. Propod almost as long as merus and carpus combined, produced posterodistally. Dactyl half the length of propod, grasping margin armed with 1 pronounced tooth.

*Pereopods 1–2:* Similar to each other. Merus prominently expanded and a little produced ante-

rodistally. Carpus shorter than half the posterior length of merus. Dactyl falcate, slender, longer than merus and carpus combined. *Pereopods 3–5:* Coxae 5–7 similar to each other, subequal in size, armed with 1 posterodistal small seta. Other parts broken.

*Pleopod 1:* Peduncle subsquare, prominently expanded backward, armed with 1 anterior plumose seta; rami unclearly segmented, inner ramus shorter than outer ramus; terminal swimming setae longer than rami.

*Uropods:* Uropod 1 slender, not extending beyond uropod 2; peduncle a little produced outer-distally, provided with 6 outer and 1 inner-distal spines; rami similar to each other, equal in size, 1/3 as long as peduncle, on outer margin armed with 2 spines, bifid apically, inner tooth more produced than the outer one, apical concavities armed with 1 pronounced spine. Uropod 2 lobate, broad, extending beyond peduncle of uropod 3, biramous; peduncle armed with marginal fringe; rami short, subequal in length, inner ramus slender, provided with 2 apical small setae, outer ramus semi-oval, broad, provided with 10 small, dispersively pinnate setae on outer and apical margins. Uropod 3 uniramous, lobate, shorter than half the length of uropod 2; peduncle broader than long, provided with 3 small pinnate setae on outer margin; rami leaf-like, provided with 14 small setae of which the greater part are pinnate, armed with 2 apical spines.

*Telson:* Very small, semi-oval, without setae.

#### Remarks

In the known corophiid amphipods, those species (Sections B and C [2, 5, 6] with fused urosome as that of the present new species) have longest and best developed uropod 1, and their uropod 2 is rather reduced and attaches to the upper part of the urosome. In contrast to them, the uropod 1 of the present new species is slender and not so developed, and its uropod 2 is well developed and attaches to the base of the urosome. Hence, the new species is clearly distinguishable from the other corophiids with fused urosome by these differences. On the other hand, the present new species has peculiar mandibular palp in which the terminal segment attaches to the middle of its

proximal one; this type has been known in only one species, *Corophium crassicorne* Bruzelius [1, 3, 5], that belongs to Section C of Crawford's system. The present new species would be closest to *C. crassicorne*.

#### Material examined

Holotype: Female, 2.16 mm. Type locality: Sandy bed in the shallow water of In-no-shima Island, Hiroshima Prefecture, Japan. Date: Aug. 1, 1984. Collector: Nobuo Sawada. Collection No.: Asia Univ. 3.

#### *Corophium sinense* Zhang, 1974

(Figs. 3–5)

*Corophium sinense* Zhang, 1974 [8], pp. 139–146.

#### Description of Female

**Body:** Depressed. Rostrum small, eyes invisible. Coxae discontinuous in series; pleonal epimera 1–3 gradually broadened at twice in turn, epimeron 3 provided with 1 posteroventral tooth; urosome segmented.

**Antennae:** In antenna 1, segment 1 of peduncle armed with 1 outer-distal spine, subequal to segment 2 in length; each segment of flagellum except for the terminal one provided with 1 aesthetasc. In antenna 2, segment 1 of peduncle provided with 1 bifid process, segments 2–3 lacking spines, segment 5 half the length of segment 4; flagellum biarticulate, terminal segment rudimentary.

**Mouthparts:** Mandibular process of lower lip rudimentary, inner lobe broad. Molar process rugose, provided with 1 short plumose seta; palp biarticulate, terminal segment reduced, directly jointed to the proximal one. Inner plate of maxilla 1 rudimentary, unarmed; outer plate with 6 bifid spines; palp biarticulate, proximal segment very

small, apex of terminal segment with 2 opposite rows of 8 spines and 7 stiff setae. Plap of maxilliped 4-articulate, terminal segment much reduced, apically provided with 1 stout, long spine.

**Gnathopod 1:** Coxa 1 prominently produced forward, not attenuate, ventrally provided with 3 long plumose setae. Propod subequal to carpus in length; transverse palm a little produced forward, armed with many bifid spines. Dactyl extending beyond palm when closed, grasping margin finely pectinate on middle part. **Gnathopod 2:** Corophid-fashion. Dactyl falcate, nearly reaching the base of propod when closed, grasping margin unarmed with spines and teeth.

**Pereopods 1–2:** Similar to each other. Merus, propod and dactyl subequal in length. **Pereopods 3–4:** Similar to each other in form, pereopod 4 prominently longer than pereopod 3. Carpus about half the length of merus, extending postero-distally, armed with 1 pair of spines on outer side, 7 or 8 spines on outer-distal end gradually growing in length. Propod of pereopod 3 provided with 1 locking spine. **Pereopod 5:** Broken.

**Pleopod 1:** Peduncle square, setaceous on outer margin; both rami equal in length, proximal segment of inner ramus dilated medially; terminal swimming setae 2/3 as long as rami.

**Uropods:** Uropod 1 extending beyond uropods 2–3; peduncle twice as long as inner ramus, 3 stout spines on inner margin gradually making larger, outer margin spinose; both rami spinose, especially inner ramus provided with 3 apical pronounced spines, outer ramus a little longer than inner ramus. Peduncle of uropod 2 a little longer than rami, provided with 1 inner-distal enormous spine; rami equal in length, marginally with many spines (6 or 7). Uropod 3 uniramous, half as long as uropod 2, peduncle as long as wide, dilated distally, both lateral margins armed with 5 spines respectively, outer spines stouter than inner ones;

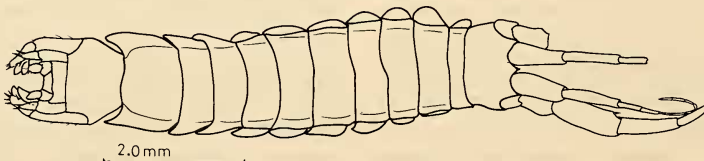


FIG. 3. *Corophium sinense* Zhang, 1974. Female, 6.83 mm.





FIG. 4. *Corophium sinense* Zhang, 1974. Female, 6.83 mm. A: Head. B: Antenna 1. C and C1: Antenna 2. D: Upper lip. E: Lower lip. F: Maxilla 1. G: Maxilla 2. H and H1: Right mandible. H2: Left mandible. I and I1: Maxilliped. J and J1: Gnathopod 1. K: Gnathopod 2. L: Pereopod 1. M: Pereopod 2. N: Pereopod 3.

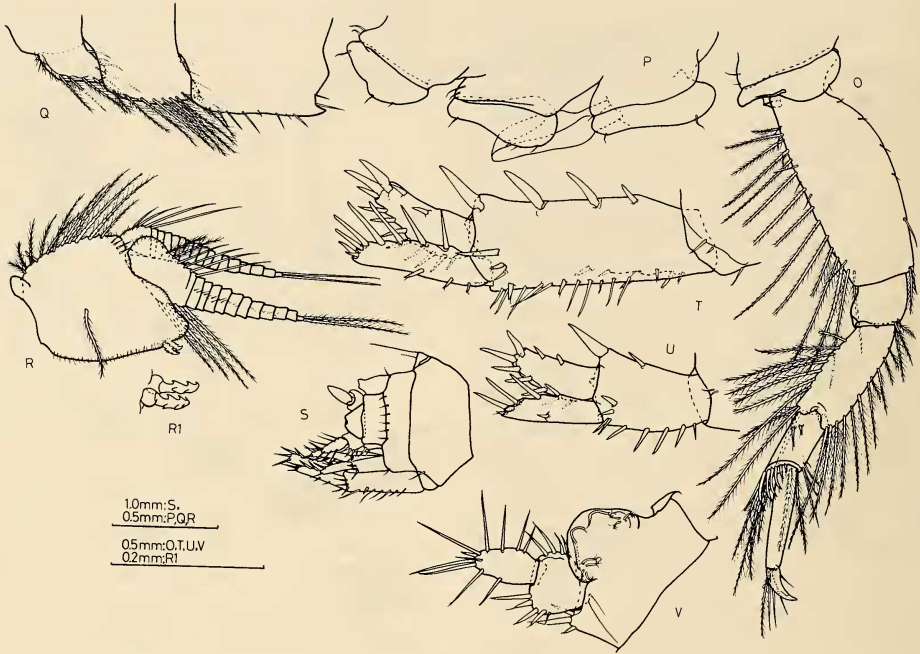


FIG. 5. *Corophium sinense* Zhang, 1974. Female, 6.83mm. O: Pereopod 4. P: Coxae 5-7. Q: Pleonal epimera 1-3. R and R1: Pleopod 1. S: Urosome. T: Uropod 1. U: Uropod 2. V: Uropod 3 and telson.

ramus long elliptical, marginally armed with 10 stiff setae and 1 apical spine.

#### Remarks

The present specimens well agree with the female of *C. sinense* described by Zhang [8] from the Shantung Peninsula, North China, though several differences are observed. The Japanese specimens lack the prominent process that was found on the mid-medial face of the peduncular segment 1 of antenna 1 in Zhang's material, and the basal spine of the peduncular segment 1 on the antenna 1 found in the present specimens is not found in Zhang's; moreover, the peduncular segment 4 of antenna 2 is armed with one middle and one inner-distal spines in his specimens, but the present specimens lack them. It seems to me that these differences in the antennae 1-2 are mere local variation. As far as Zhang's figure and description are seen, the maxilliped palp of his material lacks one apical stout spine. He may have failed in observing the spine because it is masked by many setae. One more difference, though

minor, is found in the pereopods: The carpus of pereopods 1-2 of his material is longer than the propod, but the two segments are subequal in length in the present specimens.

Although I have not yet examined any specimen of the male of this species, Zhang [8] clearly demonstrated the presence of sexual dimorphism in the antenna 2 for his material from China. The combination of this sexual dimorphism and the segmented urosome is a characteristic of the member of Section A-1 of Crawford's system [2, 5, 6]. In addition to this character combination, this species has noticeable characteristics that the terminal segment of its mandibular palp is reduced instead of equal or subequal to the proximal one in length and attaches to the apex of the proximal one. The former character is known only in this species up to date, but the latter is known in *C. arenarium* Crawford, 1937 [2] and *C. orientale* Schellenberg, 1928 [4, 7], both of which belong to the same Section A-1 of Crawford's. *C. sinense* would be related to *C. arenarium* and *C. orientale*.

*Material examined*

Two females: One described and figured, 6.83 mm. Locality: Sandy-mud bed in the shallow water of In-no-shima Island, Hiroshima Prefecture, Japan. Date: Aug. 1 to 2, 1984. Collector: Nobuo Sawada. Collection No.: Asia Univ. 2.

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